

NATIONAL PORK BOARD
Request for Proposals
Summer Call - 2008

DEADLINE: Tuesday, July 15th – 5:00 p.m. CST

The National Pork Board is soliciting research proposals dealing with:

- B – Swine Health-PRRS**
- D – Pork Safety – Pre-Harvest**
- E – Pork Safety – Post Harvest**
- H – Public Health**
- L – Antimicrobial Use & Resistance**
- M – Genomics**

Please read carefully the individual solicitation descriptions for project proposals. If you have questions related directly to the description of a specific solicitation, contact the staff member listed in charge of the program area. For questions on the submission process, contact Bev Everitt at beveritt@pork.org or 515/223-2750.

STAFF MEMBERS:

B - Swine Health-PRRS	Lisa Becton	lbecton@pork.org	515/223-2791
D - Pork Safety – Pre-Harvest, H - Public Health & L - Antimicrobial Use	Liz Wagstrom	lwagstrom@pork.org	515/223-2633
E - Pork Safety – Post Harvest	Steve Larsen	slarsen@pork.org	515/223-2754
M - Genomics	Mark Boggess	mboggess@pork.org	515/223-2606

To be considered for committee review, **all proposals must be submitted via the website by 5:00 p.m. CST on Tuesday, July 15th, 2008** (see www.pork.org for links). Proposals will be reviewed by both technical advisors and pork producers prior to the committee selection meetings. Final funding is subject to approval by the National Pork Board and USDA.

NOTES:

- Proposal selection will occur in September 2008.
- Notification of grant awards will be done in late September 2008.
- Project funding will begin November 2008.

Requests for second-year funding must be resubmitted.

B. SWINE HEALTH-PRRS

Since its discovery in 1991, Porcine Reproductive and Respiratory Syndrome virus (PRRSv) has proven itself as a significant pathogen of swine in nearly all production areas of the world. While a great deal has been learned about the virus and the disease it causes in the decade since its discovery, producers and veterinarians still find themselves challenged in finding predictably successful tools for managing or eliminating the virus from farms.

The National Pork Board's Swine Health Committee has been discussing the research results received through the PRRS Initiative funding. Based on the research results and field experiences with PRRSv over the past 4 years of the PRRS Initiative funding, the research objectives of the PRRS Initiative will focus on new areas for 2008.

Three Research Objectives have been identified for 2008 funding: PRRSv Immunology, PRRSv Epidemiology and Ecology, and PRRSv Diagnostics. The research topics under each objective to be included in funding for 2008 are as follows:

1. PRRSv Immunology
 - Identify common protective epitope(s) ultimately leading to a more efficacious vaccine providing cross-protection
 - Characterize of the structural components of PRRSv that determine protective immunity
 - Innovative vaccine development
 - Develop management recommendations based on immune response
 - Endemic Herd Infection
 - Acute Herd Infection
 - Replacement Stock

2. PRRSv Epidemiology and Ecology
 - Investigate key routes of transmission
 - Methods to eliminate infective PRRSv in semen
 - Semen "sanitation" or "washing"
 - Transmission of PRRSv in aerosols
 - Investigate what the lowest infectious dose is and the ability to detect the lowest infectious dose
 - Investigate the use of ultraviolet light on incoming air or on exhaust systems to prevent or eliminate the spread of PRRSv as it relates to aerosol transmission
 - Determine that actual distance PRRSv can travel via air under defined circumstances
 - Potential spread of PRRSv during transport of pigs
 - Examine the risk of PRRSv positive pigs in transit transmitting virus to herds located near the route.
 - Study the use/necessity of filtered trucks in transporting PRRSv naive pigs.
 - Understanding transmission

- Investigate the role of finishing sites in serving as a source of infection or reinfection for the farm, system or area
- PRRSv transmission within a farm – determine virus source for subclinical herds
- Identification of risk factors for between farm transmission
- Potential transmission of virus from infected meat products

-Alternate hosts/reservoirs of virus

- Potential reservoirs not yet investigated

-Biosecurity

- Examine the potential use of filtration to prevent entry of PRRSv and prevention of exhaust of PRRSv in currently infected herds
- Examine the potential for employees/equipment/supplies to provide an “escape” route for the virus to leave the farm during an outbreak
- Investigate if PRRSv can be harbored on the farm
- Identify mechanisms of area spread and develop suitable biosecurity protocols

-Surveillance

- Sequencing strains to aid in determining epidemiology in a region
- Integration of diagnostic lab databases to better understand PRRS epidemiology in real time
- Examine novel routes of PRRSv surveillance in both naïve and previously infected herds

3. PRRSv Diagnostics

-Development of tests to detect PRRSv in commercial herds and boar studs earlier and with increased sensitivity, specificity, and decreased cost to producers.

- Diagnostics for earlier detection at herd level
- Improvement of available diagnostic reagents
- Development of practitioner/producer based diagnostics Diagnostic techniques to detect infected semen on site

-Differentiation of exposed, vaccinated, and infected swine (DIVA)

-Test and modify PRRS risk assessment tools

4. Emerging Issues

-Evaluation of the PHFD strain of PRRSv causing high swine mortality detected in Southeast Asia.

- Characterization, sequencing of isolate(s) and infectious clone creation
- Epidemiology of isolate
- Development of diagnostics to identify this pathogen
- Compare isolate with current U.S. PRRS database
- Evaluate potential of interactions of this isolate with co-infections

Funds will be awarded for one year. Projects seeking second-year funding of a previously funded project requires submission of a fully-developed proposal that includes a demonstration of satisfactory progress on work proposed in the first year. Newly submitted multi-year proposals should provide a clear overall vision and

objectives for the entire project with a detailed plan of work and budget for the first year. Further information regarding this solicitation can be directed to Lisa Becton by email at lbecton@pork.org or by phone at 515-223-2791.

D. PORK SAFETY – Pre-Harvest

*Pre-harvest food safety research for the following agents or pathogens should include the areas of epidemiology, pathogenesis, prevalence, on-farm risk factor management, monitoring and measurement, and/or intervention or control strategies. Funding limit is \$50,000 per project. A larger funding request may be considered if appropriate justification is given, especially for farm level trials with numerous replicates. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and concepts are encouraged even if they do not fit into a specific priority area. Salmonella research is the top priority for the industry. Specific topics of interest with regard to Salmonella and other pathogens are described below (please note that these are **not** in priority order):*

1. Determine the swine prevalence of E. coli O157:H7 and Non E. coli O157:H7 STECs within production systems.
2. Risk assessment model development to quantify the relationship between on-farm prevalence of Salmonella and other zoonotic pathogens to the risk of human illness.
3. Development and evaluation of evolving molecular, and other, diagnostic tools and monitoring techniques for food safety pathogens that can be used in epidemiological investigations.
4. Test the impact of Salmonella lairage reduction programs on the amount of Salmonella found on the carcass or in the final product.
5. Evaluation of feed characteristics (feed form, dietary ingredients, antibiotic use, feed contamination levels, etc.) as a potential intervention strategy to reduce Salmonella prevalence in the pig.

E. PORK SAFETY - Post-Harvest

Funding limit is \$50,000 per project. A larger funding request may be considered if appropriate justification is given, especially for farm level trials with numerous replicates. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and concepts are encouraged even if they do not fit into a specific priority area.

1. Salmonella research is the top priority for the industry. Specific topics of interest with regard to Salmonella are described below (please note that these are **not** in priority order):
 - a. Development and evaluation of methods for enumerating pathogens before and after interventions to find out intervention effectiveness.
 - b. Determine the susceptibility of multi drug resistant (MDR) Salmonella to various interventions.
 - c. Evaluation of stress adaptation and cross protection of intervention(s) to Salmonella.
2. Impact of production practices on carcass defects and physical hazards. Research should include the prevalence, risk factor management, monitoring and measurement, and/or intervention or control strategies.
 - a. Determine the impact of alternate injection methods and/or techniques (such as hip injection or needle free injection systems) on carcass defects and/or physical hazards.
 - b. Evaluation of improper injection methods on carcass defects such as abscesses and/or physical hazards
 - c. Determine farm-level interventions for carcass defects such as abscesses and/or physical hazards from improper injection methods

H. PUBLIC HEALTH

Multi-disciplinary proposals are encouraged. Funding limit is \$50,000 per project. A larger funding request may be considered if appropriate justification is given. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and concepts are encouraged even if they do not fit into a specific priority area.

1. Studies to determine prevalence, diagnose, describe the epidemiology of and/or develop interventions for emerging and re-emerging zoonotic diseases including but not limited to; Norovirus, Clostridium difficile, Toxoplasma gondii, MRSA, Hepatitis E, Influenza A and others that may be associated with pigs.
2. Studies to evaluate intervention methods in pork production, including vaccination strategies, to protect humans from zoonotic diseases that may be present in pork production facilities.

L. ANTIMICROBIAL USE AND RESISTANCE

Funding limit is \$50,000 per project. A larger funding request may be considered if appropriate justification is given. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and concepts will be considered even if they do not fit into a specific priority area. Research priorities include:

1. Studies to characterize aerosol movement of antimicrobials, antimicrobial resistant bacteria, and or antimicrobial resistance genes from swine farms and assess potential risks and risk factors of such movement
2. Studies to assess the potential for antimicrobials in land applied manure that may be taken up by plants to affect the development and/or persistence of resistant bacteria in those plants and assess the potential risk of resistance transfer to animals fed that plant material
3. Studies of the occurrence and movement of specific genetic elements important for the development of multi-drug resistance, including an assessment of the relationship between antimicrobial use and the occurrence of these specific genetic elements.

M. GENOMICS – Application and Technology Development for Economically Important Traits in Pork Production.

Funding for this program is subject to approval by the National Pork Board and AMS. The NPB Animal Science Committee is initiating a comprehensive research program to ensure that the technologies generated by the International Swine Genome sequencing project is leveraged into the discovery and development of new technologies for the US pork industry. Additional funding is being requested from the USDA-ARS, allied industry, academic institutions and state pork producer organizations. The completion of the swine genome map (sequence) provides the starting point for understanding the genetic complexity of pigs and how genetic variation contributes to complex traits like maternal efficiency, nutrient utilization and disease resistance/tolerance. **New research programs are now needed to identify individual traits and genetic networks which influence or control economically important traits such as nutrient utilization/efficiency, disease resistance, production and reproductive efficiencies, meat quality, and the**

interaction of these traits in production systems that ensure welfare and economic/environmental sustainability.

This research should focus on the development of short and long term applications for the new technologies which will enable the pork industry to compete with other proteins in international markets. For example, genetic marker assisted selection programs to improve response to selection for conventional traits such as growth rate, feed efficiency and lean yield and enable accelerated selection for traits that are currently difficult to measure such as reproductive efficiency, feed efficiency, disease resistance and meat quality. Longer term programs will be developed that will dramatically enhance production efficiencies at the cellular level for all traits by improving nutrient utilization, mediating disease challenges, improving adaptability and survivability, increasing sow lifetime productivity, ensuring welfare and improving the nutrient profile and quality profile of pork.

1. Identify and evaluate comprehensive and significant genetic markers and genetic networks for economically important traits in the pork industry.
2. Validation of genetic markers and genetic networks across diverse production populations.
3. Improve selection response to economically important traits in the pork industry through marker assisted selection programs and related technologies. Develop commercial genomic tools and application technologies for the pork production sector.
4. Development of comprehensive phenotypic databases to assist with the identification of genomic markers for economically important traits in the swine industry.
5. Continued refinement and annotation of the swine genome sequence.
6. Develop a producer and industry stakeholder based real-time information system to efficiently and effectively deliver emerging genomic technologies to producers. Develop interactive information and educational technologies for the pork industry in cooperation with the US Pork Center of Excellence. This program should include the following objectives:
 - a. Develop basic educational tools and information for producers relating to genomic definitions and technologies so that producers are better able to understand the emerging technologies – importance and application.
 - b. Assist industry with evaluation and adaptation of emerging genetic technologies (markers, selection programs, etc). Serve as a clearing house for genome related technologies, information and application.
 - c. Contribute to the development of a centralized database and DNA storage system to maximize the research, discovery and value creation that results from this research investment.
 - d. Assist with consumer based needs for accurate real-time information and address concerns and questions regarding genomic research, for example concerns about genetic research and application. Provide the industry with science based information to address consumer concerns.